DoN S&T
THE NEXT THIRTY YEARS

A Brief Presented
to

ROUND TABLE 1

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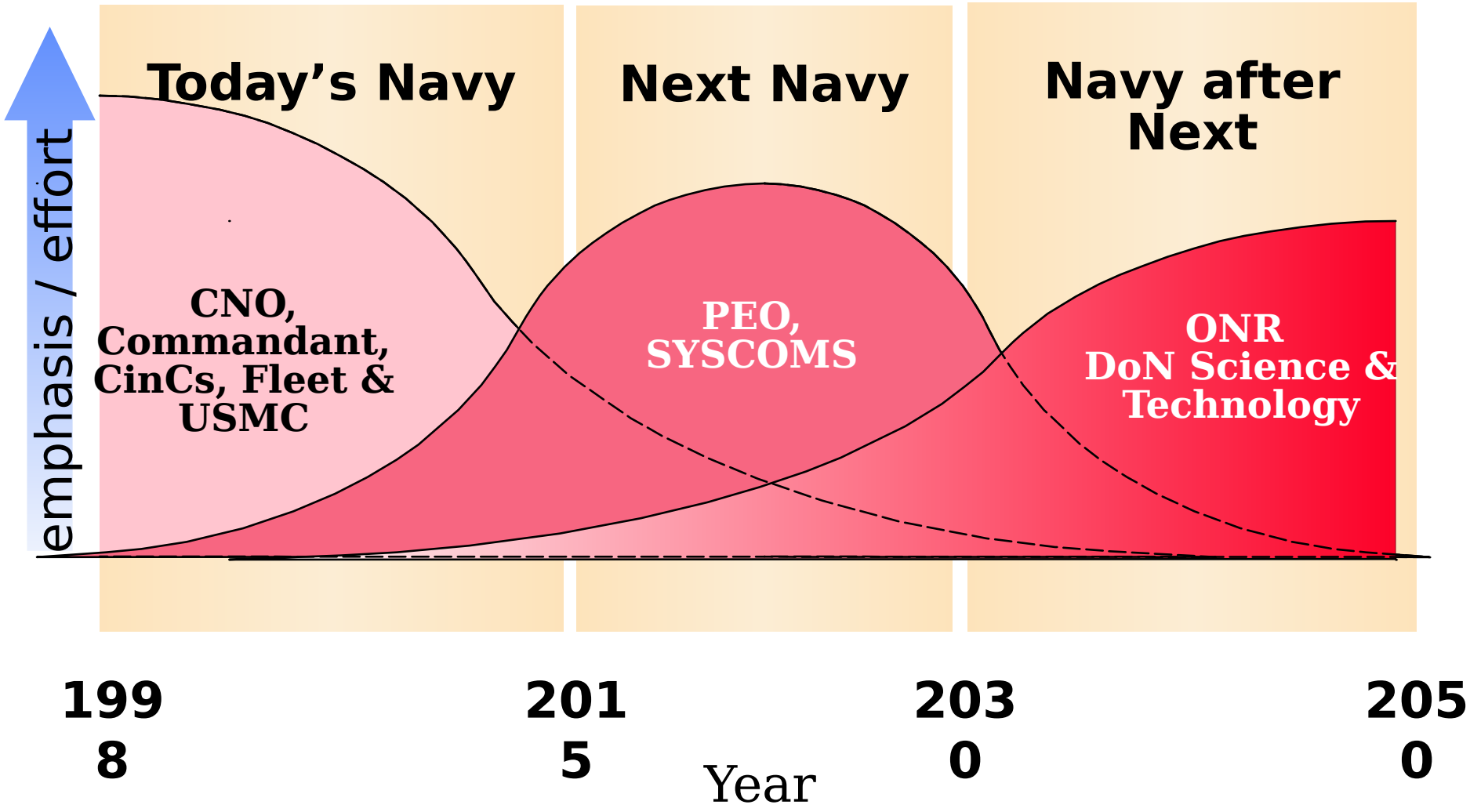
Outline

- DoN S&T Perspectives &Vision
- DoN S&T Strategy
- DoN S&T Investment
- Summary

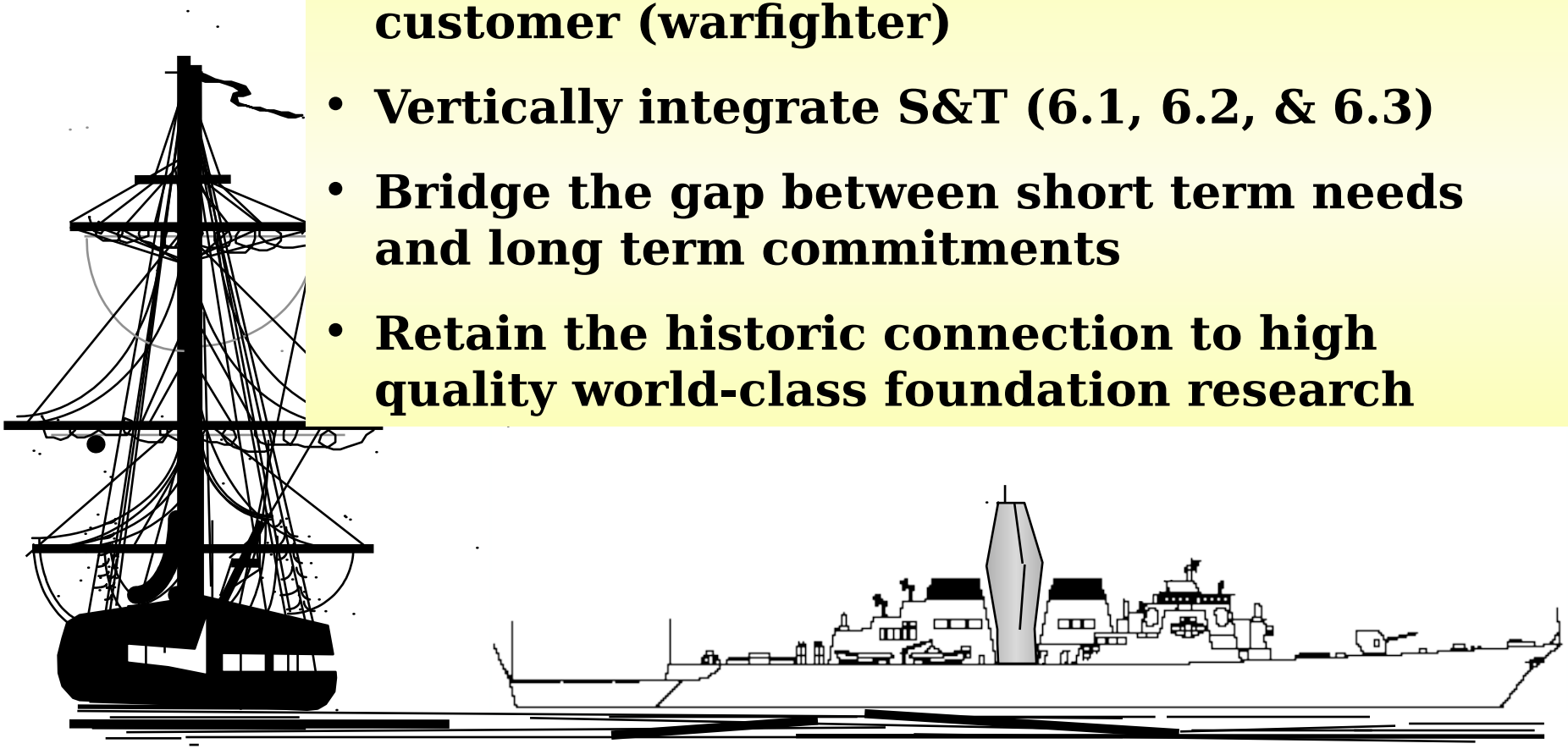
What ONR Does

Technology Perspectives



DoN S&T Vision

- **Move DoN S&T Program closer to the customer (warfighter)**
- **Vertically integrate S&T (6.1, 6.2, & 6.3)**
- **Bridge the gap between short term needs and long term commitments**
- **Retain the historic connection to high quality world-class foundation research**



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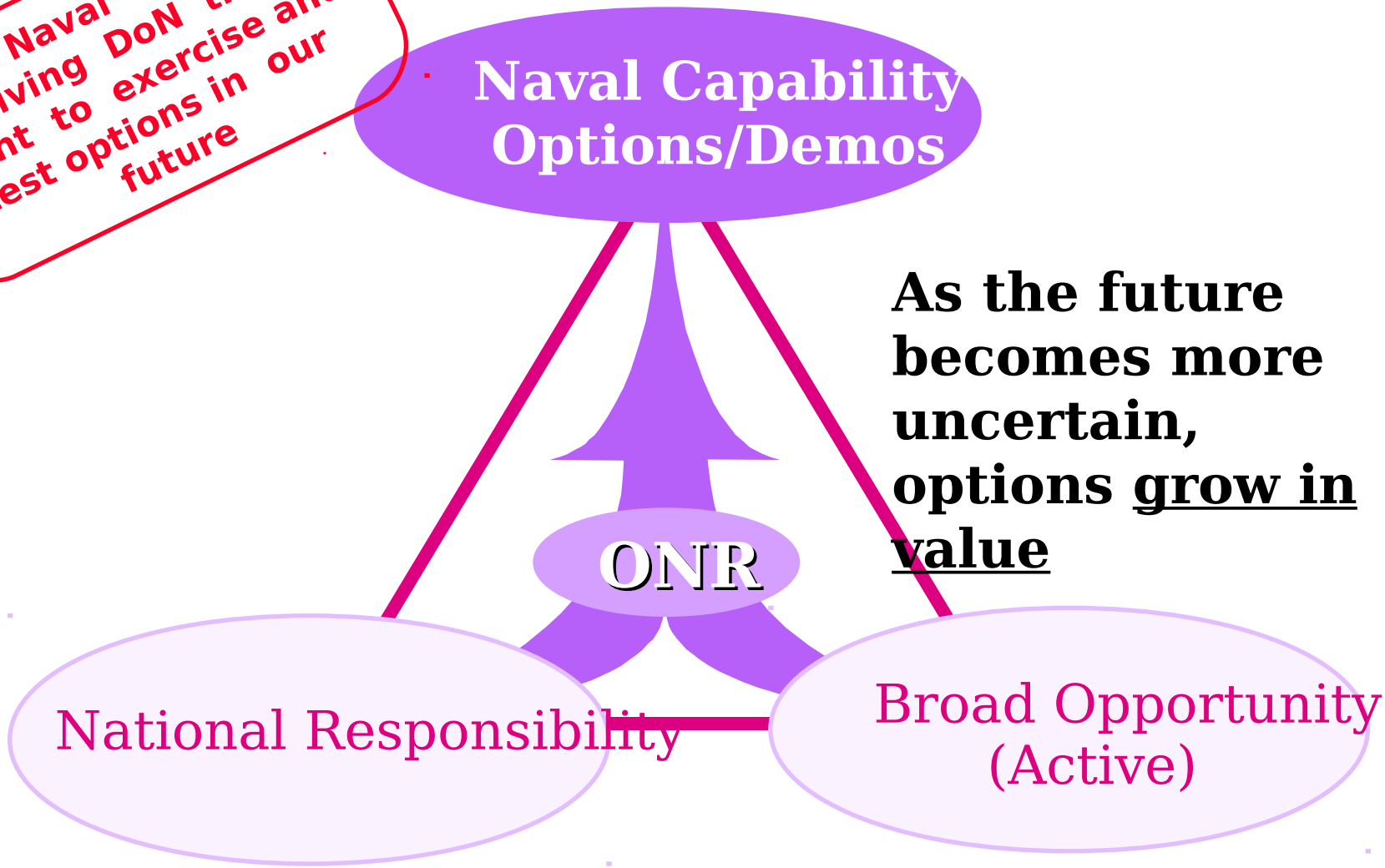
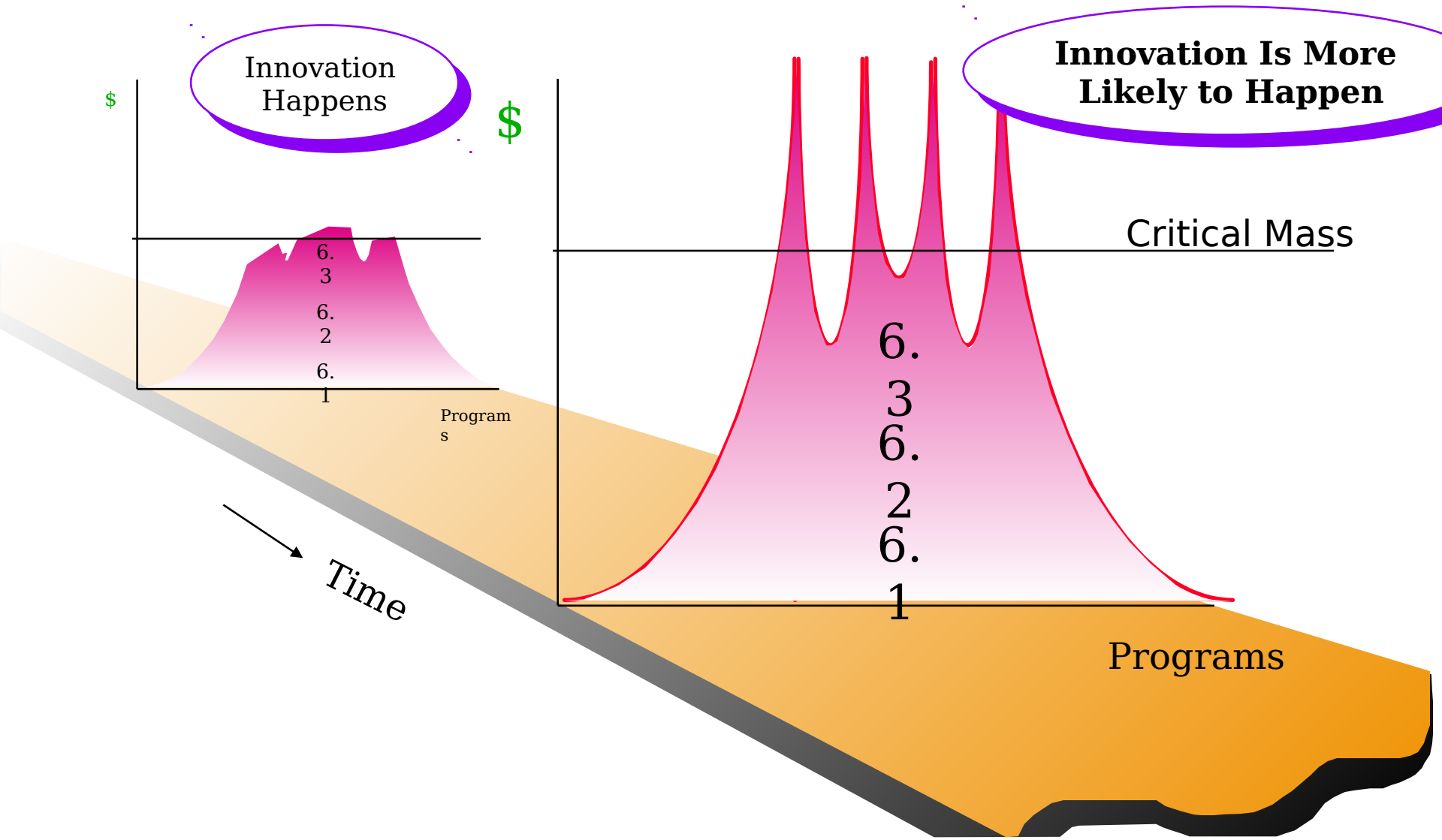
Naval S&T Investment Strate

Naval S&T giving DoN the right to exercise and test options in our future

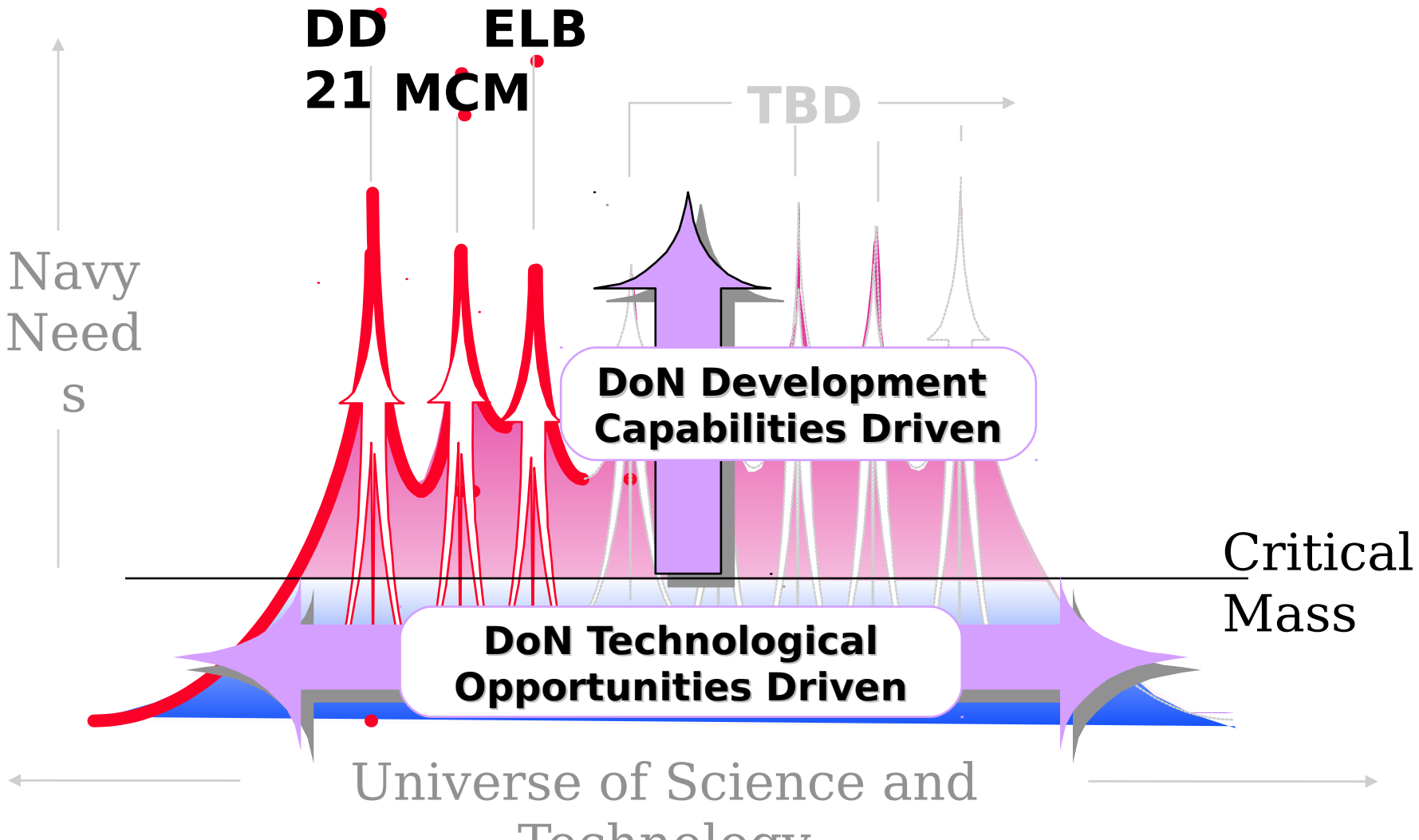


As the future becomes more uncertain, options grow in value

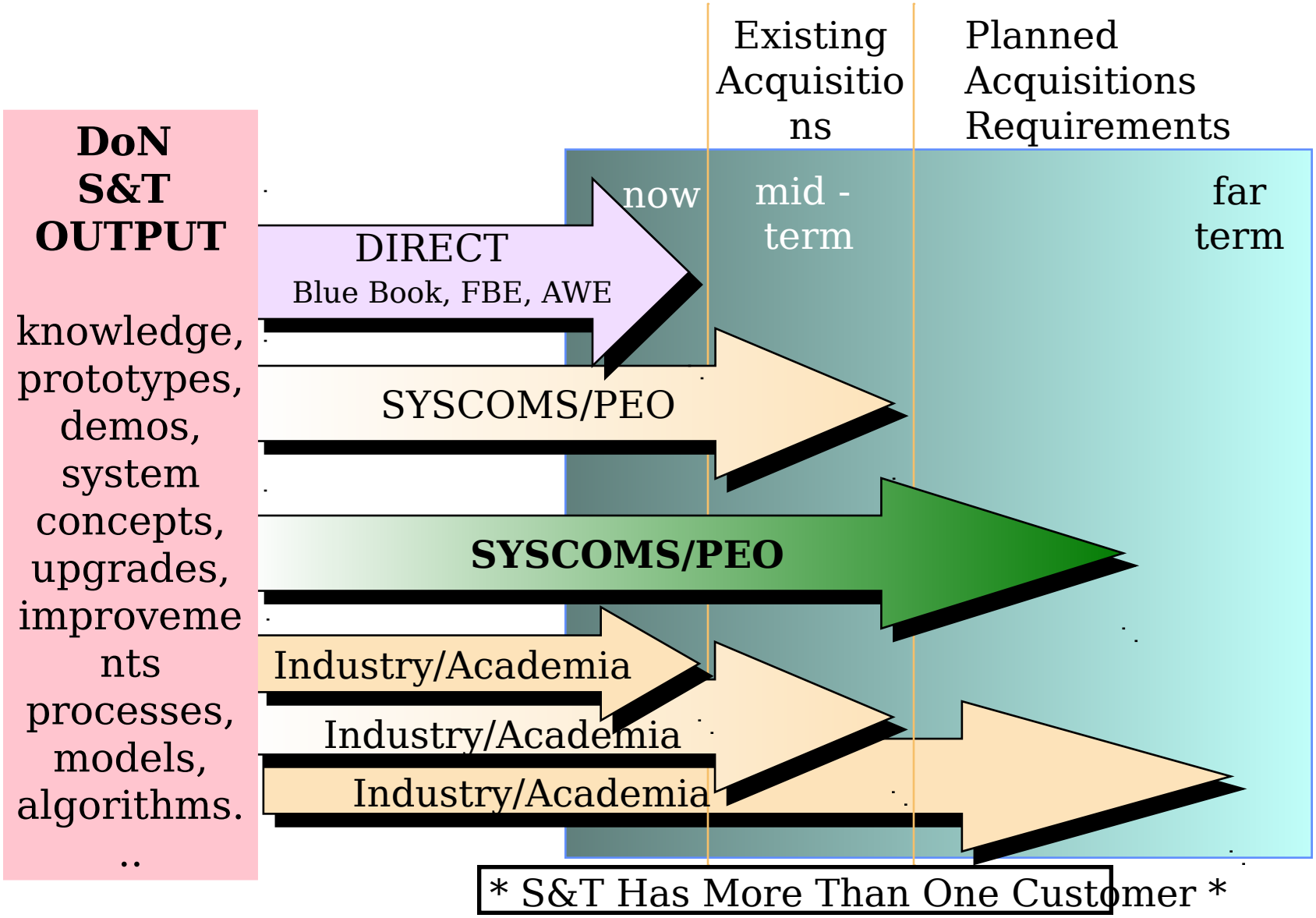
Forming Critical Mass for S&T



Future Naval Capability Options



Time Sensitive Technology Capability Options



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DoN S&T Investment

- A Two-Step Process
  - Evolutionary
  - Revolutionary

STEP ONE

1998-2012 The First Fifteen Y

Building Integrated S&T Programs for DoN S&T Investment

1. Identify

2. Build

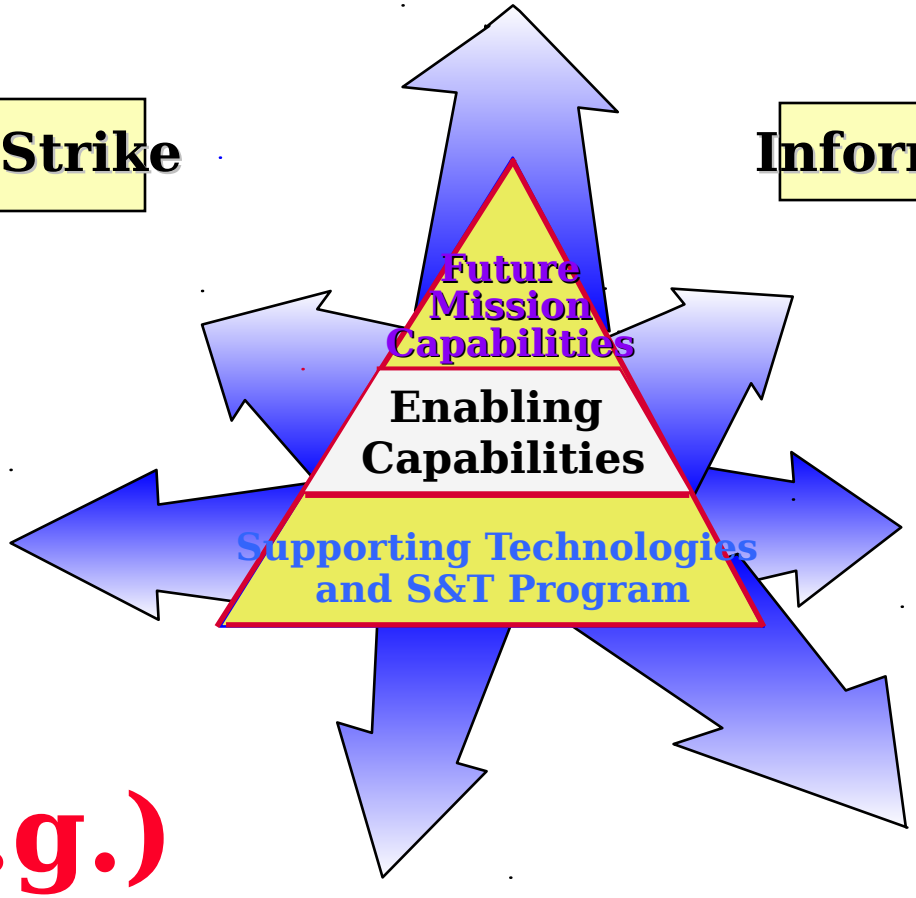
3. Monitor

Future Naval S&T Investment

Ship Over-the-Horizon Area Defense

Time Critical Strike

Information Dominance



Condition Based Maintenance

Damage Control

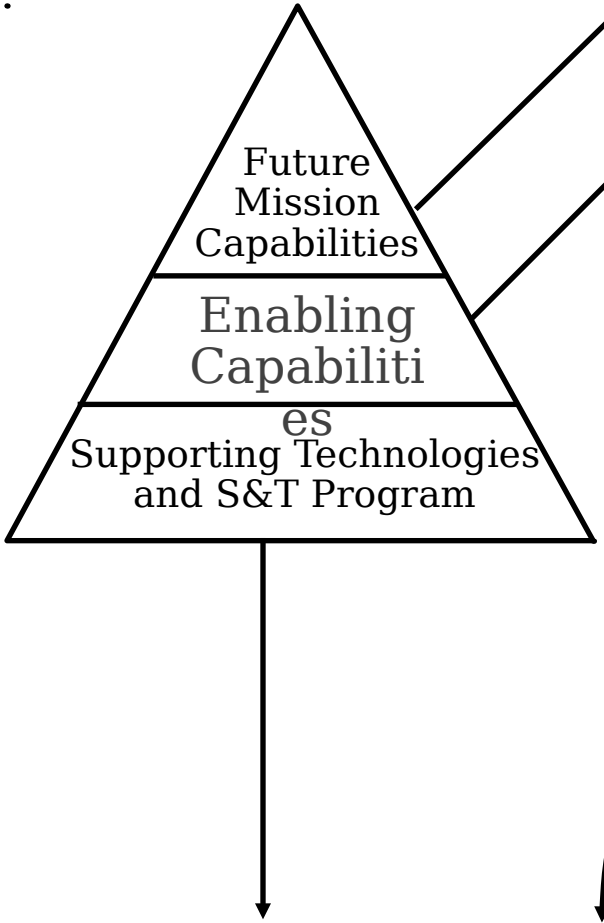
(e.g.)

PEBB

Assured Sustained Littoral Operations

Enabling Capabilities Diagram

BP10010697



Assured Sustained Littoral Operations

1. Mine Countermeasures
2. Littoral Information Superiority
3. Project and Sustain Forces Ashore
4. **Environmental Dominance**

A superior ability to forecast weapons, surveillance and assault systems' performance can provide "windows" of large relative advantage for the tactical decision maker. This ownership of the battlespace environment will enhance operational strengths while mitigating weaknesses. The key is a real-time forecast that resolves tactically important scales in the battlespace and that assimilates/fuses *in situ* and remote sensed data. Improved capability could lead to techniques that exploit certain aspects of the operational systems' environment for tactical advantage.

Supporting Technologies

- Real-time 3D littoral environment nowcast & forecast
- Stochastic acoustic field characterization (biota, internal waves, finestructure...) to design & operate coastal sonars
- Spaceborne & airborne systems to measure & infer surface and subsurface parameters (e.g. water clarity, surface waves, stratification, bathymetry).
- MPP Computational Fluid Dynamics algorithms
- High bandwidth data communications
- *In situ* autonomous sensing system
- Databases & management of large, archives

10 db Operational Capability Improvements

Assured Sustained Littoral Operations

Environmental Dominance

Real-time 3D Littoral Environment Nowcast & Forecast

Operational Capability Gap

- Littoral environment nowcasts & forecasts are inadequate for system design, realistic training, doctrine development & tactical decisions
- .Current observations & predictive models do not account for the high temporal & spatial variability of the littoral environment.

Capability Specification

- Continuous shipboard weather nowcast & forecast throughout the littoral battlespace for tactically relevant scales; forecast accurate TDAs & ETDAs for two days.

Key Technologies

- Coastal synoptic observation systems
- Accurate regional forecasts & nowcasts
- Data compression
- Powerful shipboard computers & displays
- Data assimilation theory & algorithms
- Forecast models for open ocean & surfzone waves

Related National/International Programs

Program	Agency
• Weather forecasting - US Coast	NOAA
Observational (*in situ*) systems/networks	
• Coastal geomorphology	USGS & MMS
• Coastal physical oceanography	NSF

Current Naval Program

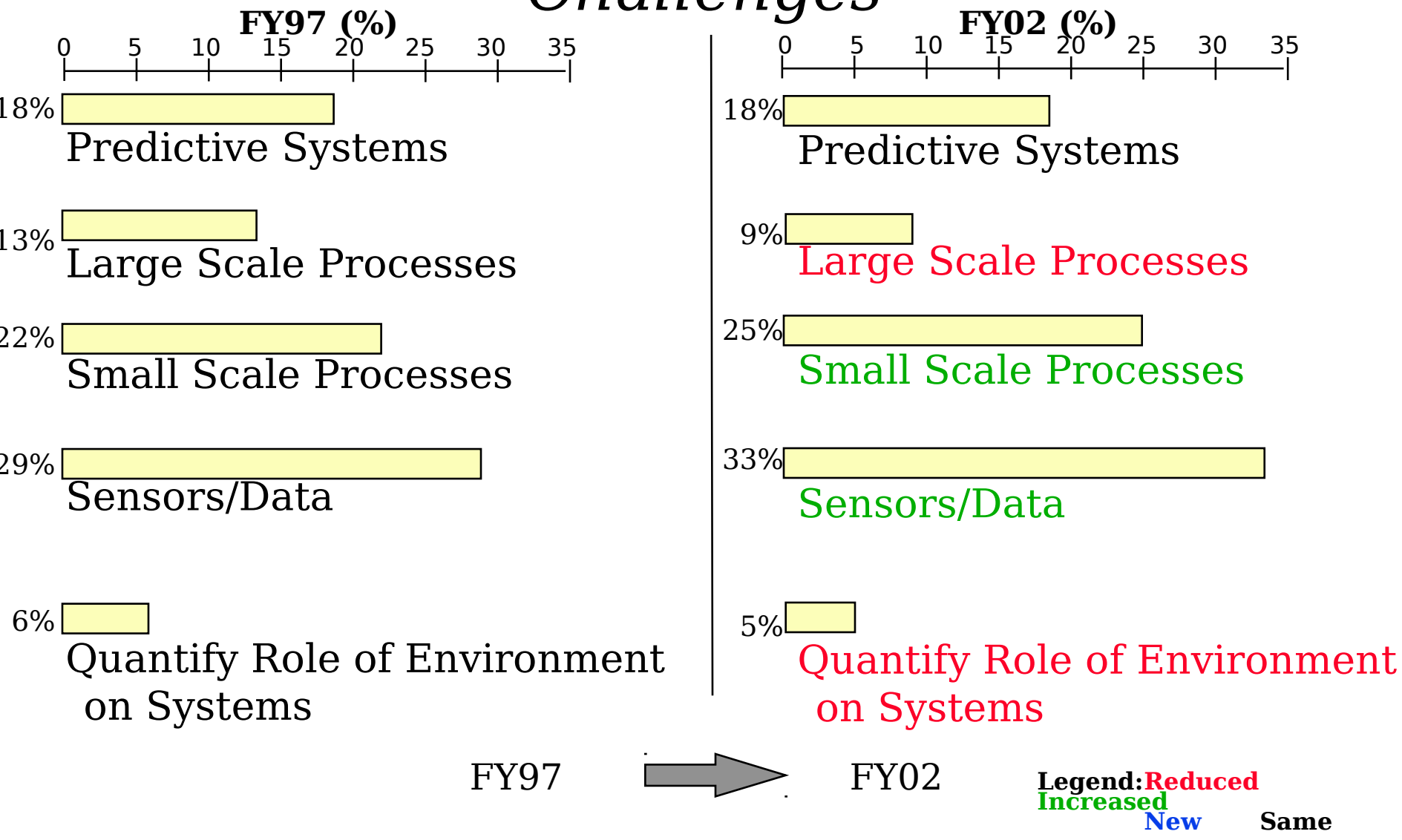
	6.1	6.2	6.3
• Coastal dynamics	✓		✓
• Open ocean waves	✓	✓	
• Coastal meteorology	✓	✓	
• Ocean prediction	✓	✓	
• Atmospheric prediction	✓	✓	
• Computers			✓
• Sensors	✓	✓	
• Exploit local environment (e.g. visibility, surface waves			
• Shipboard computers			
• Remote sensing (radar, sonar, satellite) & signal processing			

Technology Gaps/Opportunities

- Organic sensing systems: RPV, AUV, radar, sonar, expendables
- Local terrain & land surface databases
- Forecast model for shoaling waves (outside surfzone)

Environment Focus Area

Evolution of Thrusts/Technical Challenges



STEP TWO

13-2028: The Following Fifteen Yea

Grand Challenges for the DoN S&T Program

1. Identify

2. Build

3. Monitor

Grand Challenges

- Strategy to provide long-term focus
- Steady, achievable view of the future
- High-level objectives that have some risk, some excitement, motivational value
- Novel/Innovative
- Unambiguous
- Compelling
- Bold
- Broad and integrating

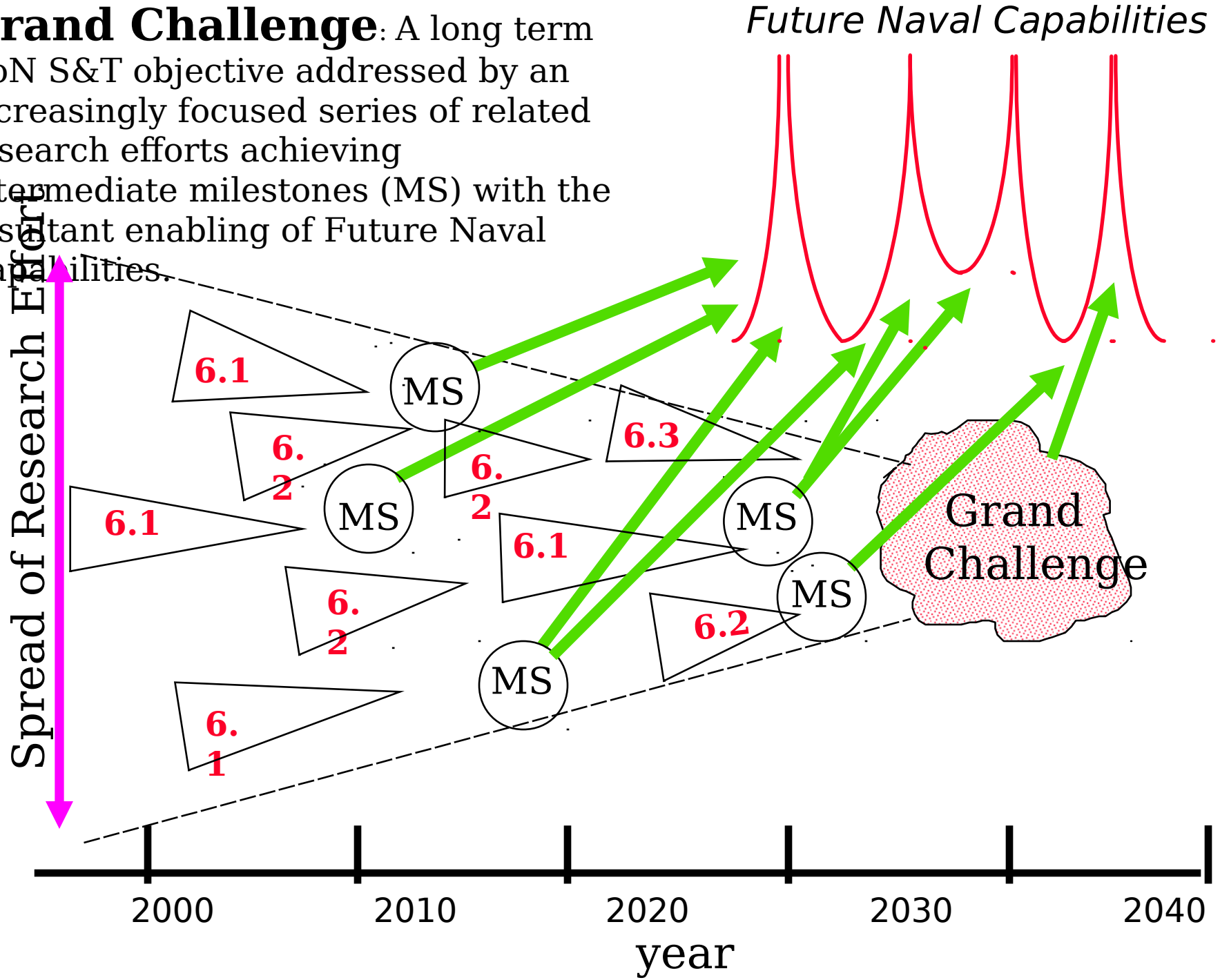
Grand Challenges

- Visionary - Navy after Next
- Compelling Navy/Marine Corps Need
- Multi-disciplinary/Multi-claimants
- Completion Time Variable, 30-50 Years
- Very Difficult, Probably Achievable
- Multiple Opportunities

but not

- Linear Extension of Present DoN S&T Programs
- Massive/Grand Engineering Projects

Grand Challenge: A long term DoN S&T objective addressed by an increasingly focused series of related research efforts achieving intermediate milestones (MS) with the resultant enabling of Future Naval Capabilities.



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Future Naval Capabilities from the Navy Long-Range Planning Objective

- New C4I Systems
- Improved Remote Sensors & Processing Systems
- Improved Platform Defense
- Mine Warfare
- More Effective Maintenance

Summary

DoN S&T Program Enables the Department to Capitalize on Technology Knowledge for the "Navy after Next"